

REMARKS/ARGUMENTS

The present application includes claims 1-3 and 5-20. The Office Action rejected claims 1-3 and 5-20 under 35 U.S.C. §103(a) over Jensen et al (US 6,666,579) (“Jensen”) in view of Zylka et al (US 2001/0027263) (“Zylka”).

Claim Rejections – 35 U.S.C. § 103

The Office Action rejected claims 1-3 and 5-20 under 35 U.S.C. §103(a) over Jensen et al (US 6,666,579) (“Jensen”) in view of Zylka et al (US 2001/0027263) (“Zylka”).

Turning to independent claim 1, the Office Action alleges that Jensen discloses instrument tracking on a computer and quotes a limitation of claim “automatically displaying on an output device each image in said collected plurality of static images in an image by image manner—to create motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image.” The Office Action then quotes the following passage from Jensen to support that Jensen discloses the above limitation of claim 1: “The display graphics processor 295 accesses the slice data set memory 290 to display the image slices on the display 250. The display graphics processor 295 also constructs graphical representations of the instrument or tool 24 and overlays the instrument graphic with the image slices on the display 250. The display graphics processor 295 may present multiple two-dimensional image slices simultaneously on the display 250 with instrument graphics superimposed upon each image slice, col 10, lines 25-50.”

In Jensen, the display graphics processor 295 constructs graphical representations of the instrument, while in the present claim1, the position and orientation of the instrument is projected onto each image. Therefore, Jensen does not teach projecting on the image the 3D

information of the orientation and position of the instrument but rather Jensen creates a graphical representation.

Further, Applicants respectfully submits, and the Office Action admits, that Jensen does not teach, that suggest or disclose the technology in the presently amended claim 1 of collecting a plurality of static 2D images in sequential image by image manner to create 3D information of said position and orientation of said instrument by creating motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image.

Further, Zylka does not cure the deficiencies of Jensen. Nowhere does Zylka teach, disclose or suggest animation of 2D static images to create 3D information of the instrument's position and/or orientation. Office Action admits Jensen does not "specifically teach collected plurality of static images in sequential image by image manner to create motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image." Applicant submits that Zylka also fails to specifically teach this admitted shortcoming of Jensen. The Office Action quotes paragraph 0019 of Zylka as support that Zylka teaches the feature in claim 1 of displaying each image in said "collected plurality of static images in sequential image by image manner to create motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image." The quoted Paragraph 0019 of Zylka states in part:

position measuring device 13 with two infrared CCD cameras 14 which are arranged on a stand to the side of the examination zone. The spatial positions of correspondingly constructed infrared light-emitting diodes can be determined by means of said cameras. In order to determine the position of a medical instrument 16 used during the intervention, in this case being a biopsy needle, the end of the biopsy needle 16 which projects from the patient is provided with three of such

infrared light-emitting diodes 17 in defined positions. In order to determine the position of the X-ray device 2, or the imaging geometry of the X-ray device 2, during the acquisition of X-ray images during the operation, three of such light-emitting diodes 18 and 19, respectively, are provided on the X-ray source 6 and the X-ray detector 7, respectively. The spatial position of an acquired X-ray image can be determined from the imaging geometry thus determined, that is, the position of the X-ray image relative to the patient 3.

As can be seen by a reading of the Office Action quoted paragraph 0019, this paragraph discloses that the spatial relationship between light emitting diodes placed on the medical instrument and the X-ray device. The spatial relationship is determined in arithmetic unit 20. Nowhere does Zylka disclose the feature in claim 1 of “automatically displaying on an output device each image in said collected plurality of static 2D images in sequential image by image manner to create 3D information of said position and orientation of said instrument by creating motion through the animation process.”

Further, the Office Action alleges that “the displaying device [paragraph 0019] displays as a sequence of images (i.e. animation) along with a position and orientation of said instrument, wherein said at least one position and orientation of said at least one instrument is projected on each image.” Rather than displaying a sequence of images to create 3d information of said position and orientation through the animation process, paragraphs 001800020 of Zylka discloses placing light emitting diodes on the X-ray device and the medical instrument and uses this information along with the image set acquired by the computed tomography apparatus to determine the spatial correlation between the two-dimensional X-ray image and the three dimensional image data set. After determination of the correlation in arithmetic unit the position of the medical instrument can be transformed into a position relative to the three dimensional image data set and this can be displayed on a monitor. Nowhere does Zylka teach, disclose or suggest the feature of automatically displaying on an output device each image in said collected

plurality of static 2D images in sequential image by image manner to create 3D information of said position and orientation of said instrument by creating motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image.

Unlike the technology in the present amended claim 1, Applicants respectfully submit that Zylka does not disclose, teach or suggest collecting a plurality of static 2D images in sequential image by image manner to create 3D information of said position and orientation of said instrument by creating motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image. Rather, unlike the present technology which uses scrolling the images to enable the user to understand the instrument information in 3D, Zylka uses an arithmetic unit to correlate the spatial correlation of the two-dimensional X-ray image and the tree dimensional image data set.

Thus, neither Jensen, as admitted by the Office Action, nor Zylka disclose the recited feature of automatically displaying on an output device each image in said collected plurality of static images in a sequential image by image manner to create 3D information of the position and orientation of an instrument by creating motion through the animation process.

Further, Applicants respectfully submit that the combination of Jensen and Zylka would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention. The Office Action provides no rationale for its conclusionary statement that with the combination of Jensen and Zylka, neither of which disclose the feature of creating the instrument position and/or orientation information in 3D by scrolling 2D images in sequential image by image manner to create 3D information of said instrument by creating motion through the animation process, would be obvious to one of ordinary skill in the art. As stated in the

Application “Previous designs have used static, non-animated data to accomplish transfer [the position and/or orientation of a surgical instrument to the user] in a method that requires substantial learned skill.” Applicants submit that animating 2D data so that the human may perceive 3D information of a surgical instrument is not obvious as all previous designs have used static non-animated data to accomplish the task.

For at least the reasons stated above, Applicants submit that neither Jensen nor Zylka, taken alone or in theoretical combination, teaches or reasonably suggests all the limitations of amended claim 1. Applicants respectfully submit that currently amended independent claim 1 is in condition for allowance.

Claims 2-3 and 5-9 ultimately depend from claim 1 and should be allowable at least for the reasons stated.

Turning next to independent claim 10, the Office Action alleges that “the limitation of claim 10 has been addressed above except the following “automatically repeating said selecting, computing, projecting, and displaying steps to create an animation using a sequential image by image presentation through said series of 2D static images.” The Office Action also alleges that Zylka teaches this limitation in paragraphs 0019-0025.

As presented above, nowhere does Zylka teach, suggest or disclose automatically repeating said selecting, computing, projecting, and displaying steps to create 3D information of said position and orientation of said instrument by creating motion through the animation process using a sequential image by image presentation through said series of 2D static images as claimed in claim 10 of the instant application. As stated above, rather than using sequential image by image presentation of 2D images to create 3D information in the technology in claim 10, Zylka uses an arithmetic unit for determining the spatial correlation between the two

dimensional X-ray image and the three dimensional image data set for determining the position of the medical instrument in the three dimensional image data set.

Further, Applicants respectfully submit that the combination of Jensen and Zylka would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention. The Office Action provides no rationale for its conclusionary statement that with the combination of Jensen and Zylka, neither of which disclose the feature of automatically repeating said selecting, computing, projecting, and displaying steps to create 3D information of said position and orientation of said instrument by creating motion through the animation process using a sequential image by image presentation through said series of 2D static images, would be obvious to one of ordinary skill in the art..

Thus, for at least this reason, Applicants submit that neither Jensen nor Zylka, taken alone or in theoretical combination, teaches or reasonably suggests all the limitations of claim 10. Applicant respectfully submits that currently amended independent claim 10 is in condition for allowance.

Claims 11-17 ultimately depend from claim 10 and should be allowable at least for the reasons stated.

Regarding independent claim 18, the Office Action alleges simply that independent claim 18 has been addressed. Applicants respectfully point out that, as presented above, neither Jensen nor Zylka teach, disclose or suggest creating 3D information by creating motion through the animation process by automatically and continuously presenting an image by image animation_of said series of static images including at least one of a position and orientation of at least one instrument and at least one image of said at least one instrument located at said at least one of a position and orientation. Rather, as presented above, Zylka uses an arithmetic unit for determining the spatial correlation between the two dimensional X-ray image and the three

dimensional image data set for determining the position of the medical instrument in the three dimensional image data set.

Further, the Applicants respectfully submit, and the Office Action provides no rationale, that the combination of Jensen and Zylka would make the claimed invention obvious to one of ordinary skill in the art at the time of the invention. Applicants submit that animating 2D data so that the human may perceive 3D information of a surgical instrument is not obvious as all previous designs have use static non-animated data to accomplish the task. Thus, for at least these reasons, Applicants submit that neither Jensen nor Zylka, taken alone or in theoretical combination, teaches or reasonably suggests all the limitations of claim 18. Applicant respectfully submits independent claim 18 is in condition for allowance.

Claims 19-20 ultimately depend from claim 18 and should be allowable at least for the reasons stated.

As claims stand amended, Applicants respectfully submit, that Jensen does not teach the claimed features of independent claims 1, 10, and 18. Further, the Applicants respectfully submit that the combination of Jensen and Zylka would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention.

Claims 2-3, 5-9; 11-17; and 19-20 depend from independent claims 1, 10, and 18, respectively. The Applicants respectfully submit that as claims 1, 10, and 18 should be allowed for at least the reasons discussed above, claims 2-3, 5-9, 11-17, and 19-20 should also be allowed.

CONCLUSION

In general, the Office Action makes various statements regarding the pending claims and the cited references that are now moot in light of the above. Thus, the Applicants will not address such statements at the present time. However, the Applicants expressly reserve the right to challenge such statements in the future should the need arise (e.g., if such statement should become relevant by appearing in a rejection of any current or future claim).

In view of the above remarks, Applicants respectfully submit that claims 1-3 and 5-20 now pending in the application contain patentably distinct subject matter over all the references of record and are in condition for allowance. Applicants, therefore respectfully request consideration of the pending claims and a finding of their allowability. A notice to this effect is respectfully requested. Please feel free to contact the undersigned should any questions arise with respect to this case that may be addressed by telephone.

The Commissioner is authorized to charge any additional fees or credit overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

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/Dennis P. Hackett/

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